SNOW SAMPLING SURVEY
in the vicinity of
PLUSWOOD MANUFACTURING LIMITED,
ATIKOKAN

February, 1983

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INTRODUCTION

In response to complaints of fallout of wood fines near a particle board plant in Atikokan, the Ministry of the Environment carried out a snow sampling study in February, 1981. This survey revealed that levels of carbon, suspended solids and tannins were significantly elevated in snow near the plant (Pluswood Manufacturing Limited) and in a residential area to the east. Minor modifications in plant process equipment were made in early May, 1982, to reduce airborne discharges of wood fibres. Stack testing at the plant was conducted shortly thereafter. Major modifications to emission controls were approved by the Ministry in September, 1983 for completion in 1984. To document the effects of the first improvements and to obtain further data before major abatement was completed, a second snow sampling survey was conducted in February, 1983.

METHODS

Duplicate samples of snow were collected on February 17, 1983 from 11 sites near Pluswood (Figure 1) and from two control locations remote from the study area. Core samples of the complete snow profile were obtained following standard Ministry sampling procedures (2). Snow meltwater samples were submitted to the Ministry's Thunder Bay and Toronto laboratories for analysis of carbon (total particulate carbon, dissolved inorganic carbon and dissolved organic carbon), tannins, suspended solids and pH. Meltwater filtrate was also microscopically examined at the Thunder Bay laboratory to identify particles in snow meltwater.

RESULTS AND DISCUSSION

Results from the 1981 and 1983 surveys are summarized in Table 1. In 1983, concentrations of suspended solids and carbon were elevated near Pluswood, compared to controls, but were much

lower than in 1981. Highest concentrations occurred at sites 3, 4 and 6, on company property, with decreasing levels at more distant sites. Microscopic examination showed that wood fibres accounted for more than 90 percent of suspended solids. There was little difference in the levels of tannins and pH between the two surveys. Figures 2a and 2b show, for suspended solids, the improvement achieved from abatement action undertaken between the first and second surveys. While levels of suspended solids and carbon in 1983 were still a little above normal in residential areas, they should represent no nuisance threat to the community. pH values were uniformly low and were similar to values of controls, except for an anomalous high reading at site 5, near the Atikokan municipal airport.

In contrast to 1981, the visible deposition of sawdust and other wood fines in snow in 1983 was much less noticeable in the study area. Site 8 was the only off-property location where wood fines were visible in snow in the second survey.

CONCLUSIONS

A snow sampling survey carried out near Pluswood's particle board plant in 1983 revealed a significant decrease in the fall-out of wood fines from 1981. This decline is attributed to abatement measures taken by the company to reduce emissions of particulate matter. Lower production rates in 1983 (approximately 10 percent less than in 1981) possibly contributed to the improvement. Elevated concentrations of suspended solids (mostly wood fibres) in 1983 were confined to company property. Future improvements in emission controls for particulate matter, scheduled within the next year, should further reduce airborne discharges. A third snow survey will be undertaken to assess the effects of this abatement action.

REFERENCES

1. Racette, D. J., and H. D. Griffin. 1981. Snow sampling survey in the vicinity of Pluswood Manufacturing Limited, Atikokan, February, 1981. Ontario Ministry of the Environment.

2. Ontario Ministry of the Environment. 1983. Field investigation procedures manual. Phytotoxicology Section, Air Resources Branch.

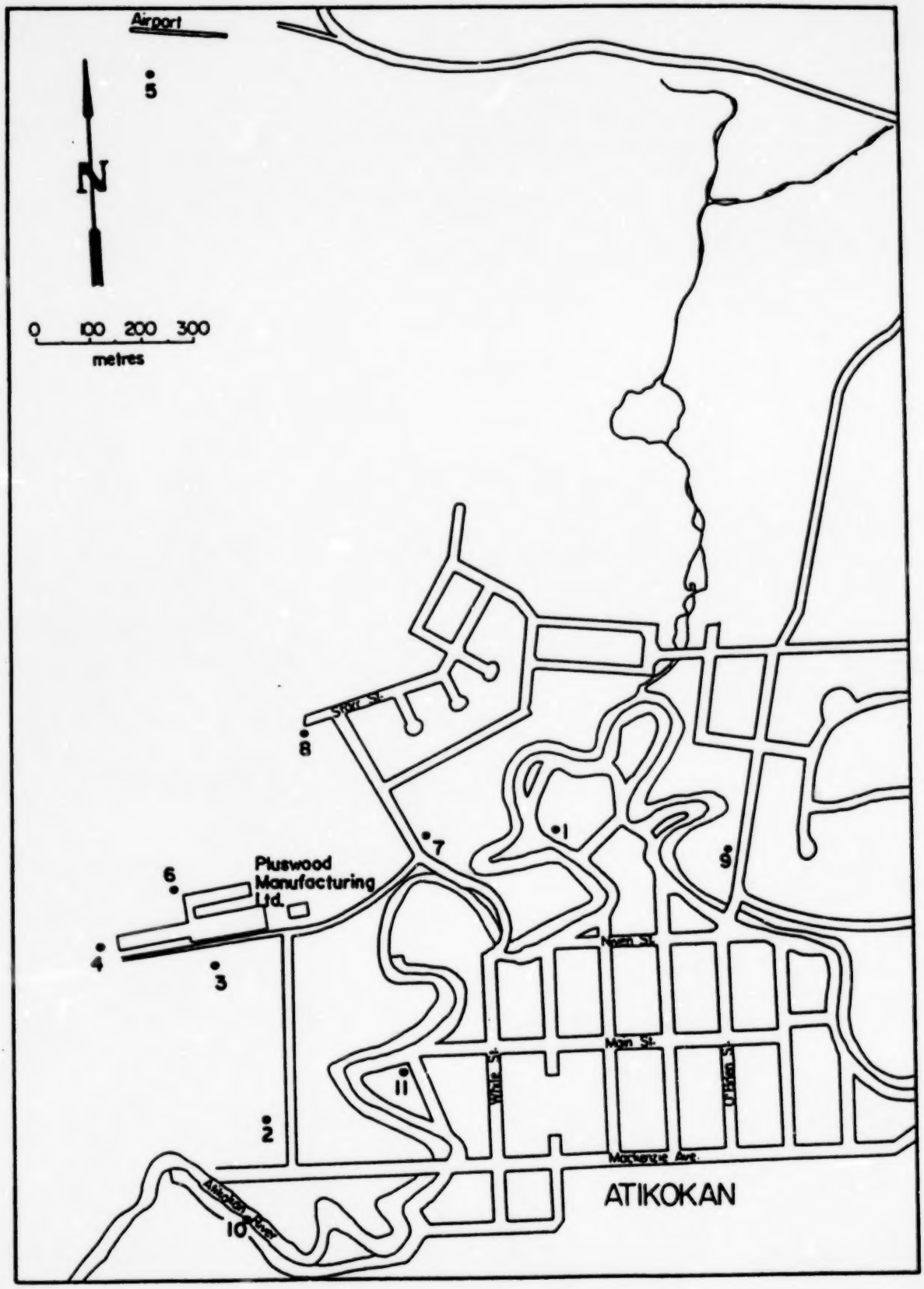

Figure 1. Snow sampling sites, Atikokan, 1983.

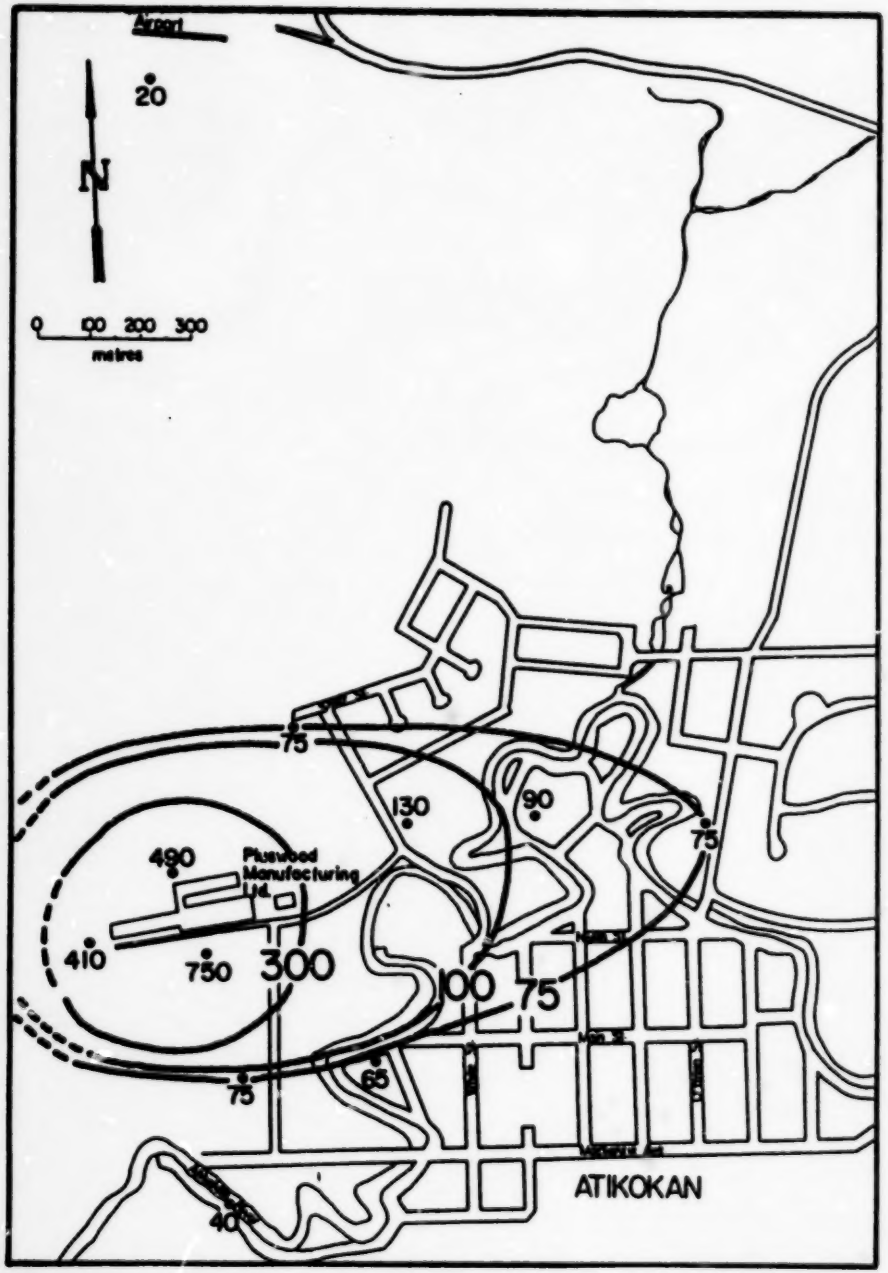

Figure 2a. Levels of suspended solids (mg/l) in snow, Atikokan, 1981.

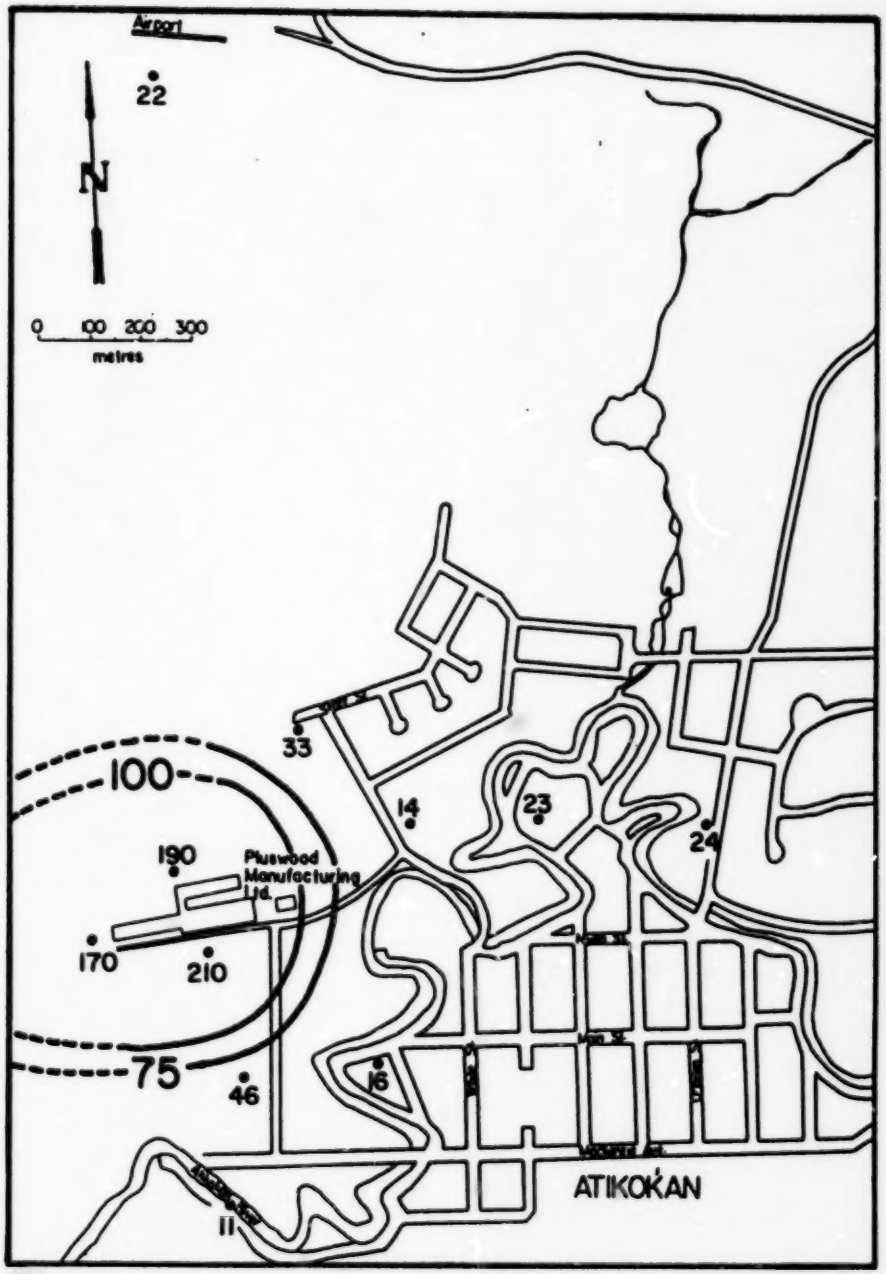

Figure 2b. Levels of suspended solids (mg/l) in snow, Atikokan, 1983.

TABLE 1. Comparison between levels of carbon, tannins, suspended solids (all in mg/ℓ), and pH in meltwater from snow collected near Pluswood Manufacturing Limited, Atikokan, in 1981 and 1983.

Site	Carbon						Tannins		Suspended Solids		pH	
	DIC[a]		DOC[b]		PTC[c]							
	1981	1983	1981	1983	1981	1983	1981	1983	1981	1983	1981	1983
1	0.9	1.0	3.4	1.5	46	13	2	1	90	23	4.7	5.1
2	0.5	<0.2	3.4	2.8	36	18	2	2	75	46	4.5	4.3
3	2.1	1.2	16.6	8.8	610	110	5	5	750	210	4.6	4.4
4	1.9	1.8	10.5	5.8	290	92	3	4	410	170	4.6	4.7
5	0.2	3.2	0.8	1.1	5	7	0	0	20	22	4.6	8.2
6	2.0	2.0	8.6	5.8	320	94	3	3	490	190	4.8	4.5
7	1.0	0.3	4.4	0.8	68	4	2	0	130	14	5.0	4.9
8	0.6	<0.3	3.6	2.0	40	15	2	1	75	33	4.4	4.3
9	0.4	0.8	2.6	1.0	31	9	1	1	75	24	4.6	6.0
10	0.5	<0.2	1.8	0.6	21	4	1	0	40	11	4.7	4.4
11	0.4	<0.2	3.0	1.1	36	7	1	<1	65	16	4.7	4.4
Controls	0.3	<0.2	0.2	0.3	2	<1	0	0	10	2	4.7	4.3

[a]Dissolved inorganic carbon.

[b]Dissolved organic carbon.

[c]Total particulate carbon.